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GLOBAL STUDY ON CONSULTING ENGINEERING SERVICES*

Prepared by

S.S. Chakraborty

UNIDO consultant

* The views expressed in this paper are those of the author and do not necessarily reflect the views of the Secretariat of UNIDO. This document has not been edited.

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SUMMARY

1. The global report on consultancy engineering services presents the current situation in developing countries, the new emerging trends and linkages with technology and financing institutions, the implications of he General Agreement on Trade-in-Services (GATS), and the scope for international cooperation.

2. In developing countries, the profession has grown at a faster rate, even though opportunities, experience and exposure were much less. Countries such as Brazil, Mexico, India, the Republic of Korea, Malyasia, Egypt and Saudi Arabia have made excellent efforts to develop domestic consultancy capabilities including norms and code of ethics.

3. Infrastructure development, particularly to support industrial activities in various developing countries are undergoing complete metamorphosis. Increasing population, poverty and trends towards social, political, technological and economic changes have put enormous pressure on the existing physicial infrastructure and cities. However, inadequate resource base is the major obstacle in the path of development, and many developing countries are encouraging private sector participation in the development of basic infrastructure.

4. Indiscriminate industrialization, urbanization and also over-exploitation of natural resources in developing countries have led to increased pollution levels, land degradation and deforestation. The solution lies in the optimum combination of preservation of biodiversity, prevention of environmental degradation and adaptation of suitable technologies for balanced and ecologically sustainable industrial development.

5. Technology is the "engine" of economic growth and consulting engineering services play a vital role in the technology transfer process. Consultants can ensure absorption and assimilation of technology; increase its effectiveness in day-to-day operation, and in solving operational problems. They play a crucial role in guiding nations to adapt the right kind of technologies for their developmental requirements, in particular environmental-friendly technologies.

6. The world of information technology is changing rapidly. Communication is the key to transfer of data and information playing an important role in the transmission of the information. Lately, there has been a quantum jump in this sector and a new concept of information super highway has taken shape. The concept has revolutionized the total area of information technology and its applications in all aspects of engineering science and technology.

7. Major sectors where consulting engineering services will be required in various developing region include improved agricultural production (including optimal exploitation and utilization of water resources), energy (including oil, gas and power), industry, environment, information technology and telecommunications, and infrastructure development such as transportation, rural and urban development, water supply and sanitation.

8. Much of the demand can be met from within the developing region itself, whilst specialized hi-tech areas for which developing countries have not yet acquired the desired level of expertise may seek the active participation of developed countries. For acquisition of skills in engineering science, consulting engineering firms continue to face numerous constraints in their efforts to develop and strengthen their capability. Of late, in large-scale multilaterally-funded projects, consultants fom developed countries are being given lead roles relegating with some form of cooperation with local consultants, for the latter have experience of functioning in adequate measure under conditions/circumstances peculiar to developing countries.

9. On the home front, inadequate awareness about the usefulness of engagement of consultants amongst clients, acts as a deterrent in the growth of the profession. Many industries/departments have self-contained consultancy units leading to distortions in the functioning of the already limited market of consulting engineering services. Consultants of developing countries lack adequate opportunities, congenial atmosphere and face major system constraints that hamper their growth.

10. GATS has opened up a new era of trade in services under the Uruguay Round of Multilateral Trade Negotiations. It provides for a most favoured nation treatment to the services of other countries. This, in practice, has tilted in favour of developed countries because of various restrictions and constraints imposed indirectly by them. These have important implications on the meaningful implementation of objectives of the policy which needs to be addressed in time.

11. Among various measures for removal of constraints, efforts at the national, regional and global levels are needed to help in the establishment and growth of consulting engineering services from developing countries. At the national level, enhanced government support is vital towards providing necessary infrastructure to consultants. In addition, increased interaction between Research and Development (R & D) institutions and consultants, and a greater role of consultants in the planning process will go a long way in helping them prove their capabilities. Nodal agencies at the national level should help in the coordination and regulation of activities of consultants to ensure professional excellence. Consulting firms in developing countries should acquire ISO-9001 certification to enhance international competitiveness.

12. At the regional level, greater cooperation invarious identified sectors isneeded to facilitate true technology transfer and fulfil mutual consultancy requirements. In this context, United Nations Asian and Pacific Centre for Transfer of Technology (APCTT) has been facilitating technology sharing and transfer negotiations in developing countries in the ESCAP region.

13. Concrete efforts are needed to promote industrial cooperation among consulting companies and associations of developing and developed countries,and between developing countries themselves, to support a greater role of consulting engineering services from developing countries while strengthening their capabilities. An international Panel of Experts in Consulting Engineering Services may be proposed to assist in the collection,

collation and dissemination of data regarding consulting engineering requirements and capabilities in different countries to assist in the development of information technology for exchange of information between developing countries; to consider effective participation of local international consultants from developing countries as lead consultants in large-scale projects, and support them in their marketing efforts in the region; to analyse the provisions of GATS in both letter and spirit to open up a large range of opportunities for consultancy which will help to strengthen those services in developed and developing countries; and to ensure that consultants from developing countries are able to introduce quality systems in their organizations.

INTRODUCTION

14. The Global Preparatory Meeting for the First Consultation on Consulting Engineering Services held at Geneva in June 1994 identified the key issues for the First Consultation on Consulting Engineering Services to be convened in Vienna from 4 to 7 July 1995. The main objectives of this Consultation are to strengthen the domestic consulting profession, and to promote international cooperation, technology transfer and commercial ventures.

Background

15. With economic and technological development, there has been increasing appreciation among developing countries of crucial importance to domestic consulting capability for rational and balanced industrial and technological development. Consequently, there is growing concern that such capability be effectively strengthened.

16. The developing countries are now undergoing a rapid change in the industrial sector by moving towards higher value-added technologies and skill-intensive products. This structural change in manufacturing has been different depending upon the level of development. This restructuring process of the economies and in particular of the industrial sector points towards the necessity of strengthening design engineering and consultancy services at the national level.

17. The Global Preparatory Meeting for the First Consultation on Consulting Engineering Services organized by UNIDO provided various proposals for designing an operational strategy including guidelines for action by national governments to promote and strengthen their local consulting engineering services in the context of international industrial cooperation.

18. The Meeting had an in-depth discussion on the topics raised in the paper "Strategies and policies for the development of consulting engineering services in developing countries" (ITPD.3(SPEC.)), prepared by the UNIDO Secretariat. It identified the following issues for the First Consultation on Consulting Engineering Services:

(a) Constraints on the development of local consulting engineering services;

(b) Measures to overcome those constraints; and

(c) Opportunities for international cooperation.

19. As background to the First Consultation, a global report on consulting engineering services was prepared indicating the new trends and the extent to which developing countries are involved.

Objectives of the study

20. The objectives of the study are:

(a) Emerging trends in developed and developing countries in the field of consulting engineering services, particularly in technology and associated areas;

(b) Assessment of demand for consulting engineering services in various fields;

(c) Scope of meeting the demand from within the group of developing countries themselves and the consequent need and scope for global interaction;

(d) Identification of strategies to be adopted and measures required to be taken for making consulting engineering services from developing countries most competitive in both conventional and hi-tech areas;

(e) Constraints (policy, technological, manpower) in the development and export of consultancy within developing countries and in developed countries;

(f) Implications of GATS on developing countries.

Methodology and approach

21. The global report has been carried out through:

(a) Meetings/discussions/interactions with:

(i) Associations and focal points representing public and private consultancy activities in developing countries;

(ii) Representatives from international financial institutions;

(iii) Embassies of developing countries;

(b) Study/desk research of available published literature comprising:

(i) Country profiles;

(ii) Published data/information;

(iii) Policies and procedures.

I. DEVELOPING COUNTRIES: CURRENT SCENARIO

22. The consulting profession in developing and developed countries evolved under different environment and circumstances and underwent various stages of development. In some of the developing countries, substantialprogress has been made for improvement of their research and development capabilities and establishment of expertise in the consulting engineering services. Some developing countries, however, are still striving to reach the acceptable level of skills.

Evolution of consulting engineering services

23. The consulting engineering profession evolved under different circumstances and environment in developed and developing countries together with the different stages of evolution, as outlined below:

(a) Developed countries

24. Consulting services in developed countries evolved over a period of 200 years. During this period, professional standards, ethics, value-svstems and traditions improved and gradually took roots. The series of events through which the profession evolved are:

(i) Emergence of formal education;

(ii) Elevation of engineering to the status of an applied science and evolution of engineering science;

(iii) Recognition of consulting engineering as a profession;

(iv) Establishment of professional societies;

(v) Opening of consulting practices by individuals;

(vi) Establishment of consulting firms;

(vii) Setting-up of associations of consulting engineers;

(viii) Development of professional and ethical standards and code of practices;

(ix) Establishment of federations of consulting engineers associations;

(x) Development of joint ventures and other strategic alliances.

25. Prior to the establishment of consulting engineering as an independent profession, engineering works such as highways, railways, ports, irrigation works, buildings and other facilities were designed by engineers on the staff of owners. Most of the construction work was also done by the engineering corps using labour-supply contractors. These pioneers made impressive advances in design and construction techniques and built some of the finest engineering works.

26. However, as the demand for services increased, opportunities opened up for private enterprises to develop construction and consulting services on a large scale. Rapid industrialization stimulated demand for services. The clients were interested in quality services, and selection of consultants was on the basis of their previous experience. Thus, the profession in developed countries grew in an environment of a rapidly increasing market for services, quality consciousness, private sector entrepreneurship, and a supportive environment of professional societies.

(b) Developing Countries

27. The recent evolution of consulting services in developing countries shows some of the characteristics of that in developed countries which took place over a longer period of time and under more favourable political and economic circumstances. However, the profession in most developing countries lacks the basic strength of that in developed countries.

28. In developing countries, time for moving from one stage to the next stage was short and events took place in rapid succession under the following constraints:

(i) The market for services was uncertain;

(ii) The private sector was weak;

(iii) The public sector dominated the market;

(iv) Selection and remuneration of consultants were inefficient;

(v) A strong supportive environment was lacking.

29. Therefore, good opportunities to develop ethics, value-systems, sound traditions, high standards of professionalism, and incentives to acquire new skills and upgradation of existing skills were simply missing.

Current scenario

30. Significant changes are taking place all over the world practically on all fronts, be it political, economic, industrial or technological.

31. Developing countries were trapped in a vicious circle of poverty and low economic base, acute resource shortage and inadequate investment. However, plenty has been achieved by many countries in improving their human resources

and technological base through limited R & D efforts and basic consultancy services in areas such as engineering, management and software relevant to their own conditions.

32. Among the developing countries, there is a large potential of cooperation in services such as water resources, energy, industry, environment, health services, electronics, information technology and telecommunications and infrastructure development such as transport, housing, urban development, water supply and sanitation. All these are mainly due to geographical proximity, lower cost of engineering services and similar socio-economic conditions.

33. Consulting engineering organizations of some of the developing countries have already been competing successfully in a variety of fields with counterparts from developed countries for international projects.

34. It may be noted that a substantial number of experts and professionals from developing countries have made their presence felt even in developed countries. System constraints along with lack of congenial atmosphere and adequate opportunities are proving a hinderance for consultants to prove their skills at home and in other developing countries, and for upgrading their technological base. Developing countries because of their competitive technical manpower and geographical proximity have a good potential of interactive professional support.

35. Some of the developing countries such as Argentina, Chile, Brazil, China, Colombia, Egypt, India, Indonesia, Malaysia and Mexico have taken steps to open up their economy to attract foreign direct investments. These steps were taken to face global competition and to integrate their economies with the world environment. This economic opening and rapid technological advances taking place in developed countries have created challenges and opportunities for consultants. Industrial, trade and foreign investment policies have undergone major changes to integrate them with global practices. It should mean more and more inter-active dialogue, recognizing the skills and requirements of each other and to play complementary and supplementary rather than competitive roles. The regional situation is as follows:

(a) Africa

36. Inspite of the development that has taken place, a large population still falls short of the basic necessities of life and education; hence, the development of technical skills and consultancy profession was rather limited. In this context, consultants from more advanced developing countries are in a position to share their experience and expertise for faster development of this region.

37. In the recent past, however, local consultancy in African countries has taken roots but is not being utilized. Local consultants are being blamed for lack of experience and are often confronted with shortage of qualified staff at various levels for larger projects. Thus, the development activities in some African countries such as Cameroon and Kenya are largely being supported

by consultants from developed countries with whom they have started venturing into forming collaborative associations.

38. However, the situation in Egypt is different as the country's economy had a number of large public sector organizations that carried out the engineering of all projects financed locally. With the Government encouraging a market-oriented policy approach for investment, local consulting firms in Egypt have also started forming joint-ventures with foreign firms from developed countries. Egypt and Zimbabwe have the necessary support infrastructure mechanism, but they rely on foreign cooperation for high technology matters.

39. In Africa, the general scenario has been that of limited growth in the recent past, but some countries such as Lesotho, Malawi, Mozambique and Zambia, in the continuing process of recovery from a severe drought of 1991-92, have created an environment of development on all fronts of economic activity thus offering ample opportunities for consultants.

40. Uganda has also succeeded in creating a free enterprise economy through a supportive policy framework, monetary programmes and substantial inflow of private capital to finance its development programmes which should hold great promise for consultancy services.

41. South Africa has started integrating its economy with the rest of the world. The consultancy profession in the country is quite diversified and competent with strong links to consulting firms from developed countries. This transitional period has brought into focus major areas of infrastructural development such as roads, highways, housing, telecommunications, water resources, health services, education and other related social infrastructures. It is a promise for greater interaction with other countries and opens numerous opportunities for consultants to participate in their economic development and regional cooperation.

(b) Latin America and the Caribbean

42. Most countries of the region, particularly Argentina, Brazil, Chile, Colombia and Mexico have relatively well developed consulting engineering firms. These countries are now characterized by dynamic economic growth, regional economic integration and democratic governance. The economic recovery from a decade-long slump and the challenges posed by the economic liberalization policies require the further development of consulting engineering services.

43. The impact of practices, know-how and extensive transfer of technology from developed countries, and a longer period of exposure to international practices helped these countries to achieve higher levels of expertise in the consulting profession which are mainly in the private sector.

(c) Asia and Pacific

44. Some countries of this region such as China, India, Indonesia, Malaysia, the Republic of Korea, Singapore and Thailand have improved their research and

development capabilities and made substantial progress in technology upgradation. Consulting Engineering Services in these countries have excellent achievements to their credit at the national and international levels.

45. Some of the countries had few consultancy skills until the end of 1960s, but from then onwards, these countries started rapidly acquiring technical expertise. With a strong R & D base, excellent technical education and rapid technology transfer process, consulting engineering services have come a long way. This has enabled consultants from these countries to demonstrate their skills and compete in the international arena also.

46. India, Pakistan, Bangladesh and Sri Lanka inherited a common system of engineering institutions and practices from the British. Their strong traditions of maintaining competent in-house capacities in government organizations for designing and constructing public works continued and inhibited private sector development for a time. The situation, however, is changing and private sector consulting firms have developed a capacity to undertake these works. Some of the companies have formed joint-ventures with foreign firms and have been able to maintain high standards of efficiency, productivity and innovative capacity. Associations of consulting engineers have been established in these countries and they are taking up their activities gradually for invigorating the profession.

47. China, the world's largest developing economy has demonstrated its skills in conventional and hi-tech areas. Consultancy as a profession is gradually taking shape in the private sector and it is fast learning the professional practices.

48. The Republic of Korea presents an example of successful development of consulting engineering profession. Prior to independence, design and construction activities were entirely in the hands of the Japanese. After the Korean war, defence and reconstruction works financed by the Government of the United States of America increased considerably and large firms from that country employed Koreans both in design and construction activities. Korean education standards, opportunities for training and transfer of technology provided by post-war reconstruction and entrepreneurial talent and capacity of the Koreans led to rapid development of the consulting profession in the private sector. The Republic of Korea has taken steps to modernize its consultancy profession and has since established policies that require foreign consulting firms to work as subcontractors to Korean consultants in all projects, except those requiring sophisticated technologies.

49. Although a number of countries in Asia and the Pacific have made notable advances, much more needs to be done to improve their private sector environment, generally in areas such as public enterprise reforms and infrastructure development. Nevertheless, the current development strategies being pursued in various countries hold the promise of sustained and rapid growth on all fronts of developmental activities. The inherent danger in this fast development process and industrialization is, however, seen in terms of increased levels of air and water pollution, contamination by toxic wastes, soil erosion, land degradation and deforestation. What is required, is the

optimum combination of preservation of bio-diversity, prevention of environmental degradation and adaptation of suitable technologies.

(d) Middle East

50. Most of the countries in the Middle East started their industrialization programmes with the oil boom in 1973. It enabled foreign consultants to set up practices in these countries. Later on, these were supplemented by expatriates and local entrepreneurs who had ventured into developed countries for advanced engineering education. Iran adopted policy measures to encourage the development of the consultancy profession through participation of the private sector, while Iraq decided to develop local consultancy services through public sector organizations. Similarly, in other countries such as Kuwait, Saudi Arabia, the United Arab Emirates and Oman, the oil boom,coupled with encouraging policies for private sector participation, helped in the development of the consultancy profession.

51. Today, there exists a large consultancy infrastructure in these countries which has been developed either with local skills and expatriate participation or as joint-ventures with foreign companies from developed countries.

II. EMERGING TRENDS: TECHNOLOGY AND ASSOCIATED AREAS

52. The on-going trend of private sector participation, increased emphasis on energy conservation and environmental protection, while building the basic infrastructure, and the need for fast technology transfer have thrown up major challenges for consulting engineering services. Preservation of bio-diversity, prevention of environment degradation and adaptation of upgraded technology (specially in areas such as information technology, transportation and renewable energy) call for an increased role of consultancy experts and offer excellent opportunities to consultants from developing countries to enhance their capabilities.

53. Technological resources such as engineering science and R & D facilities in most of the developing countries are undergoing upgradation and expansion to brace international competitiveness. Advances in technologies, especially in information technology are revolutionizing the very concept of services. The declining cost of information technology is creating opportunities for developing countries to leapfrog stages of technical development and explore new avenues of comparative advantage. As service industries rely increasingly on information technology, they tend to depend more on inputs in terms of capital and human resources. Within information technology-based services, developing countries which are able to supply labour with the requisite skills at lower cost have been able to carve out areas of comparative advantage, a process that would continue to evolve. Software development is increasingly being traded across borders with subsidiaries or partners overseas, transmitted electronically back to the parent or partner company. Many of the developing countries are significant providers of such services (Egypt, India, the Republic of Korea, Malaysia, Mexico, Taiwan and Thailand).

54. The services revolution places a premium on the development of supportive physical and human infrastructure. In physical infrastructure, a competitive telecommunication system is especially important for the development of long-distance services. Most developing countries are hard-pressed to meet the demand for even basic telecom services, and investments in suppliers and marketing networks for value-added services may be considered almost unaffordable luxury.

55. However, technology now allows a country to develop a dual structure for telecom services by investing in low-cost dedicated networks for parallel business deals while expanding the basic infrastructures. The private sector can play a lead role in this process.

56. Rapid rates of economic growth, industrialization and urbanization have put severe strain on existing infrastructure in many countries. In some other countries, their level of development has remained inadequate for sustained economic expansion. Rehabilitation, repair, modernisation and expansion of basic transport infrastructure viz. roads, ports, airports, railways and waterways have to be taken up on a priority basis. Financing of the huge investment requirements for the purpose poses a formidable challenge. Many countries of the region are enlisting the support of the private sector for financial resources and technical expertise for the development of transport, communication and power infrastructure. However, only the most advanced amongst the developing countries are likely to succeed in such strategies and attract both domestic and international investors to invest in such infrastructures.

57. Some of the developing countries have already started pooling in their resources for effective cooperation in the R & D sector. Further, with the rapid economic liberalization taking place across the globe, the governments of developing countries are beginning to encourage the private sector in infrastructural development as additional resource mobilization strategy while improving managerial efficiency. This role is being increasingly assumed by the private sector thus opening up more opportunities for consultancy services.

58. More and more industrial enterprises in developing countries are looking for technology partners in diverse areas. In this respect, APCTT has been facilitating technology-sharing and transfer negotiations. APCTT has over 1,000 partners in about 70 countries enabling it to provide an integrated package of technology services to industry with emphasis on environmentally-sound technologies. In this context, APCTT has found that more and more Indian small- and medium-scale enterprises were approaching them for technology partners in diverse areas such as food industry, chemicals, agriculture and agro-industry, biomedical technology and pharmaceuticals, plastics, rubber, paper, wood and textiles. For example, out of 409 companies that sought technologies, as many as 371 matching partners were Indian firms. According to the data available at APCTT, there has been a 900 per cent increase in technology-sharing facilities by the small- and medium-scale sector from 300 in 1991 to 3,000 in 1995.

59. With the advent of industrialization, infrastructural facilities for transportation have not kept pace with the development process thereby creating imbalances. The phenomenal increase in the number of vehicles on road has resulted in a manifold increase in pollution levels and energy Therefore, some developing countries have already started planning/implementing energy-saving, eco-friendly systems such as Mass Rapid Transit Systems (MRTS) for transportation of commuters in dense urban areas. What is needed is a balanced combination between transport, energy and environment.

60. There remains much scope for expansion in developing countries of traditional service export areas. This applies to tourism which remains the largest single source of foreign exchange earning from services for developing countries as a whole. A few developing countries are beginning to make inroads in some service areas in which industrial countries are the dominant exporters. In this context, Thailand's effort to turn Bangkok into a financial and transport hub, and Singapore's increasing role as the regional corporate headquarters and media-base can be mentioned as examples.

61. The world is also witnessing demands for improved technologies in every field such as:

(a) Improved agriculture and agro-based industries;

(b) water resources conservation, development and management of natural resources, particularly water;

(c) Energy conservation and management, development of eco-friendly power system and non-conventional and renewable energy;

(d) Small-scale industries;

(e) Housing;

(f) Ports and harbours;

(g) Transport;

(h) Biotechnology;

(i) Health care;

(j) Software development;

(k) Building physics;

(l) Value addition to existing natural resources (water, minerals, forests), bio-diversity and environment;

(m) Development of new metals;

(n) Telecommunications.

62. Developing countries, as the trends would indicate, are increasingly concerned with economic growth and construction activities which are intimately associated with consulting engineering services.

63. This calls for a more systematic approach which may need structural changes in economic policy, organizational techniques, methodologies, management, etc. This would be possible only through and by the use of consultancy experts.

III. SCOPE FOR GLOBAL INTERACTION

64. Most of the demand for consulting engineering services can be met from within a developing country or from within a developing region because of their near identical environment and needs. For deficient or specialized hi-tech. areas, constant interaction and collaborative measures globally are imperative on a complementary and supplementary basis. Constraints that impede the growth of the profession in developing countries are to be addressed suitably.

Assessment of demand in consulting engineering services

65. The world trade in services has grown from 17 per cent in 1980 to 22 per cent in 1993. With the explosion in information technology taking place worldwide, the share of services in world trade is set to double by the year 2000. This, coupled with the desire of developing countries to accelerate their industrialization, opens up a whole new era of opportunities for consultants. The multilateral funding agencies and other donor countries have also been contributing enhanced resources primarily for the development of infrastructure facilities which could help the developing countries to attain the objective of faster development.

66. The developing countries in their endeavour to progress and industrialize rapidly have identified and prioritized certain specific sectors/industries for development. These are likely to experience higher growth in the next five to ten years as a result of substantial investments in new projects and expansion/ modernization of existing ones. These investments will offer a vast potential for consultancy services. Although the core sector projects were earlier confined to government/public sector participation only, these have now been opened up to private sector participation as well. Some of these projects are also being implemented either on a build-operate-transfer (BOT), build-operate-organize (BOO) or BOLT basis.

67. The absence of data from all developing countries makes it difficult to give the demand pattern in different sectors. Projections of multilateral, bilateral and local funding in developing regions indicate demand for consulting engineering services in the following areas:

68. Agriculture (including irrigation & water resources), energy (including oil and gas and power), industry, environment, information technology and

telecommunications, infrastructure development such as transportation, urban development, water supply and sewerage.

69. Apart from basic infrastructure requirements, a number of developing countries lack the essential industries needed for building basic infrastructure. The establishment of these industries is important for rapid economic growth.
Consulting engineering services will be needed for developing the following industries:

(a) Iron and steel;

(b) Cement;

(c) Paper and pulp;

(d) Fertilizers and chemicals;

(e) Insecticides and pesticides;

(f) Drugs and pharmaceuticals;

(g) Light engineering industries;

(h) Agro-based industries;

(i) Petrochemicals; and

(j) Small-scale industries.

Scope

70. Many developing countries have come a long way as far as development is concerned. Though poverty, poor health and illiteracy continue to be problems, a lot has been achieved by developing countries in improving their human, industrial and technological resource base through limited research and development and consultancy services.

71. In the context of ever-increasing demand for new technologies in the global arena, no organization, either in developed or in a developing country, can be expected to possess complete expertise and/or technology in each and every sector. This is because the technologies that are relevant today may be obsolete tomorrow. Therefore, it may be important to have the perception of changes taking place elsewhere and endeavour to exchange and collaborate on a complementary and supplementary basis between and amongst countries.

72. In some countries, such as Brazil, China, India Mexico and South Africa a major development has taken place over the years in acquiring certain levels of skills and technology. It would be desirable that the technologies of both developing and developed countries are blended together for upgradation in terms of its appropriateness and optimal utilization of resources in the conditions of developing countries, wherever necessary.

73. In order to enhance their domestic expertise and to compete internationally, consulting engineering organisations in some developing countries have already moved/are moving towards forming joint ventures/ consortia within and between themselvesand/or with consultants from developed countries, particularly in deficient areas.

Constraints

74. The problems and constraints consulting firms of developing countries are facing in expanding their activities within the country and in the international market have been identified as follows:

(a) The tendency of large companies to have self-contained consultancy units without outside inputs and interchanges causes distortions in the normal functioning of the already limited market for consulting services. Similar conditions also prevail in the public sector which is the major market for consulting engineering services;

(b) Shortage of technically competent and experienced staff and limited managerial and marketing capabilities;

(c) Lack of appropriate data base and inadequate information and networking systems regarding business opportunities, upgradation of technologies and technology transfer;

(d) Government policies in developing countries sometimes do not provide enough encouragement and incentives for promotion and development of local consulting engineering services;

(e) Local international consultancy firms in many domestic projects are relegated to play a secondary role which results in organizational and technological concepts being introduced without proper adaptation or consideration for local resources. It is to be noted that direct transplantation of developed countries' experience does not always produce the desired result, and that effort to develop proper local methodologies and approaches are therefore necessary;

(f) Another important characteristic constraint is the fluctuating nature of the consultancy market. Economic cycles, stop and go economic policies, strategic changes and the shifting of long-term government investment programmes may lead to ups and downs in the demand for consultancy services;

(g) Inadequate awareness about the usefulness of consultancy services among clients including financial institutions and commercial banks also acts as a damper to marketing of consultancy;

(h) Of late, to the disadvantage of international local consultants in the case of multilaterally-funded projects in the home country, invariably expatriate consultants are being given the lead roles. This is despite local consultants being comparatively better placed by virtue of their extensive experience in terrain- and technology-specific consultancy services relevant

to developing countries. In some projects, only foreign firms from developed countries are short-listed and local international firms, despite merit, are not being considered;

(i) Financial support measures such as low-interest credit facilities, export-guarantees, diplomatic support, assistance in bid-bonding and soft no-interest loans which consultants from developed countries enjoy are generally not available to the consulting firms of developing countries;

(j) Bilateral Assistance. A large number of developed countries and international lending agencies are providing assistance to developing countries. Often, donors prefer to assign well-known consultants even where relevant expertise is available with the recipient country, thereby limiting local consultancy;

(k) Marketing and promotion costs for local consultants are relatively very high and chances of success are limited;

(l) GATS has opened up an altogether new era of trade in services. It provides for most favoured nation treatment to the services of other countries. The developing countries, however, find it difficult to set up business centres in developed countries or to sponsor personnel on temporary assignments for providing services due to various constraints and restrictions imposed by these countries, e.g. visa restrictions, professional practice restrictions, non-recognition of academic qualifications, etc.

Identification of strategies and measures to be adopted

75. Most developing countries recognize that growth of the domestic profession will be tied in a large measure to economic development and acceleration of industrialization by strengthening the technological base.

76. Despite unfavourable circumstances which the consulting profession has been facing in developing countries, several countries have been able to develop consulting engineering capabilities matching international standards. Their major concern, however, is the quality and relevance of training of their work forces. In-house training can partially compensate for the shortcomings.

77. The consultants from developing countries such as Brazil, China, India, Mexico and South Africa have had the experience of sourcing technology and then adapting it to suit the levels of technical competence, demand, and other conditions specific to a developing country's environment. Therefore, consultants from developing countries would appear to be most suited to provide appropriate solutions for developmental projects. Because of similar environment, consultants from a developing country may not only be able to identify the constraints in a system in another developing country, but also offer developmental solutions, whereas it may be difficult for consultants from developed countries to do the same.

78. To encourage further growth of local consulting engineering organizations and the concept of North-South and South-South cooperation, the following strategies/measures are suggested:

(a) Meaningful transfer of technologies between and amongst developing countries is likely to expand the range of available technology. Moreover, transfer of technology among developing countries would lead to transfer of consulting skills, thereby adding value to their inputs;

(b) Government support for:

(i) Strengthening of consulting capabilities and marketing opportunities;

(ii) Effective institutional support;

(iii) Developing new technical processes and basic design capabilities;

(iv) Increased participation of developing countries in the formation of strategic alliances in the form of consortia and joint ventures, and further acceleration of regional cooperation. Seminars, workshops, training courses are useful, but not as effective as joint ventures that provide opportunities for domestic and foreign firms to work together for a long period with joint responsibility for assignments and results. If the individual companies who are members of the consortium are already registered with the funding agencies in their individual capacities registration of the consortium based on the individual experience should be automatic;

(c) Local international consultants to be invariably considered for lead roles for domestic projects by international funding agencies. This will also be in the overall interest of the project;

(d) As a policy, suitably qualified domestic international consultants to be considered at par with foreign consultants for the purpose of shortlisting on domestic projects;

(e) Domestic consultants should acquire ISO-9001 certification for Total Quality Management (TQM) to brace international competitiveness;

(f) Interactive cooperation in the area of "information technology" between developed and developing countries;

The revolution in information technology will facilitate reliable and faster transfer of data and information and promote working together project-wise;

(g) Enhanced participation of domestic international consultants in the technology transfer process by donor countries. The process of technology transfer may continue even after the completion of the project, if necessary;

(h) Greater involvement of local consultants in the process of relevant government agreements related to trade and commerce, as well as interaction with R & D organisations, academic institutions and other concerned agencies;

(i) Since, this is a "brain industry" with ultimate dependence on people trained in science and technology, skilled manpower, needs to be constantly cultivated. This can be achieved by providing and expanding opportunities for on-the-job training at home and abroad. Certain developing countries have built up such institutions of higher learning of comparable international standards. These could be utilized advantageously by other developing countries.

(j) For increasing awareness, there is a need for regular interaction between users of consultancy services and the consultants. This would create an environment for exchanging views, operational experience and information which would go a long way in benefitting both sides.

(k) The regulation of the consultancy profession in every country should be through a centralized agency. Such registration should be exclusively on the basis of merit, experience and level of expertise so as to check mushrooming of consultants. This agency should ensure conformity to the established laws, regulations and code of ethics by the consultants;

(l) Regional and subregional economic integration areas in the developing countries should be supported and interlinked to enhance cooperation and capability of consulting firms in these countries.

IV. IMPLICATIONS OF THE GENERAL AGREEMENTS ON TRADE-IN-SERVICES (GATS) ON DEVELOPING COUNTRIES

79. GATS marks the beginning of a new era in trade-in-services and opens up opportunities and challenges for developing countries. However, the obligations under the most favoured nation and transparency clauses are not being implemented by developed countries in letter and spirit, especially for creating opportunities for the consultants of developing countries to do business in developed countries.

80. International trade-in-services is not a new phenomenon. Transportation, travel, and insurance have long been important traded activities. What is new is the rapid expansion of international service transactions over the past decade or so and the advent of new modes of supply as transmitted over electronic network.

81. GATS, which forms part of the Final Act of the Uruguay Round of Multilateral Trade Negotiations signed at Marrakesh on 15 April 1994, is an important milestone in the history of world trade. For the first time, a new set of rules for conduct of trade-in-services has been formulated under the

General Agreement on Tariffs and Trade (GATT) system. It is estimated that if GATS is implemented, world trade in services will increase from the present US$900 billion to US$3,000 billion within a decade. The objectives of the negotiations on trade-in-services as stipulated in the Punta Del Este Declaration and the preamble to the GATS state "to establish a multilateral framework for trade-in-services with a view to expanding such trade under conditions of transparency and progressive liberalization and act as an instrument of promoting economic growth of all trading partners including the developing countries".

82. Thus, GATS provides the framework for the achievement of higher liberalization of trade through successive rounds of multilateral negotiations. The Agreement recognizes the special needs of developing countries and provides partly for these needs to facilitate their participation in international trade-in-services. GATS basically covers four modes of international delivery of services, namely:

(a) Cross-border supply (transborder data flows, transportation services;

(b) Commercial presence (provision of services abroad through foreign direct investment or representative offices);

(c) Consumption abroad (tourism);

(d) Movement of personnel (entry and temporary stay of foreign consultants and visit of foreign consultants).

83. The GATT document in its preamble on GATS:

(a) Recognizes the growing importance of trade-in-services for growth and development of the world economy;

(b) Wishes to establish a multilateral framework as a means of promoting economic growth of all trading partners;

(c) Desires progressive liberalization on a mutually advantageous basis securing an overall balance of rights and obligations while giving due respect to national policy objectives;

(d) Recognizes the right of members, particularly developing countries, to regulate and introduce new regulations on the supply of services within their territories in order to meet national policy objectives;

(e) Desires to increase participation and export of services from developing countries by strengthening their domestic services capacities and their efficiency and competitiveness;

(f) Takes particular account of difficulties of least developed countries in development, trade and financial needs.

84. The general obligations for signatories include:

(a) The most favoured nation clause emphasizing the need for non-discrimination, i.e. equal treatment of service suppliers from within and outside the country. Although, unconditional most favoured nation treatment is a basic obligation of the signatories, exemptions are allowed. Exemptions whose coverage is still being negotiated will, in principle, be time-bound;

(b) The transparency clause which calls for publication of all relevant measures of general application (except during emergency conditions) which pertain to or affect the operation of the agreement or any other agreement pertaining to trade and services to which the member is a signatory.

85. This would imply that if a consultant from a developed country would wish to start an office in a developing country for provision of services or vice versa, this should be possible. However, the ground realities are somewhat different. Some developed countries have introduced strict visa restrictions and/or other similar measures for such purposes even for temporary transfer of people who are to be used for provision of services. Other impediments relate to professional practice restrictions, non-recognition of academic and professional qualifications etc. Many consultants from developed countries have been able to establish their business centres in developing countries without any difficulty. The same cannot be said in the case of consultants from developing countries.

86. This issue has been raised recently by the developing countries with the World Trade Organization (WTO-OMC) in response to its demand for implementation of economic liberalization reforms. The developing countries have indicated to WTO-OMC that opening up of financial sector services would be largely dependent on easier market access for professionals of all categories. WTO-OMC would persuade developed countries to respect their commitments on negotiations regarding the movement of highly skilled professionals across the borders for they are committed to implement the decisions arrived at during the Uruguay Round of Negotiations.

87. General obligations do not require any member to provide any confidential information and intend to facilitate increased participation of developing countries through negotiated, specific commitments relating to strengthening and increasing their domestic consultancy sector. Also, there are specific commitments such as market access and national treatment. They apply to services listed by a country in its schedule of commitments subject to the limitations cited above. The market access commitment calls for each member to accord service and service supplier of any other member, treatment no less favourable than that provided under the terms "limitations and conditions" agreed and specified in its schedule. National treatment requires that each member treats services and service suppliers of another country no less favourably than its own services and service suppliers.

88. In addition, there are agreements on financial services, telecommunications and air transport services. GATS also deals with disputes settlement. The GATS agreement marks the beginning of internationalization of services and is a vital step towards the next stage of economic globalization.

89. The developing nations realize that GATS paves the way for future multilateral liberalization. The agreed framework provides for continued negotiations to be completed within two years of the establishment of WTO-OMC. Nothing constrains a member from undertaking further unilateral liberalization provided it is consistent with the multilateral disciplines established by GATS.

90. Since the services agreement permits countries to negotiate specific commitments on cross-border movement of people who are providers of these services, the developing countries can use them for gaining increased access for temporary movement of skills and professional people. Developing countries should be aware that technical qualifications, standards, and licensing requirements are used fairly.

V. INTERNATIONAL COOPERATION

91. To further promote consulting engineering services from developing countries, a Panel of Experts could be set up including representatives of consulting engineers. This Panel should monitor the implementation of the plan of acytion to be adopted by the Consultation to promote consulting engineering services of developing countries.

92. In order to increase the knowledge of science and technology in developing countries, UNIDO should promote interregional cooperation between developing countries for the promotion of consulting engineering services. In this context, it is proposed that UNIDO should set up a Panel of Experts for Consulting Engineering Services. The objectives and role of this Panel, amongst other functions, might include the following:

(a) Facilitate developmental and technological requirements of the developing countries through a dialogue with the multilateral funding agencies for the removal of existing constraints and restructions to the more extensive use of consultants from these countries;

(b) Collect, complie and disseminate information regarding demand and supply of consulting engineering services in various industrial sectors;

(c) Support the marketing efforts of consultants of developing countries by providing technical assistance, appropriate marketing measures and other promotional activities;

(d) Inform financial institutions and international agencies to extend technical assistance and credit facilities to national and regional programmes aiming at strengthening consulting capabilities in developing countries;

(e) Set up a data base on consultancy capabilities in developing countries, technological needs of these countries, and consultancy requirements for small- and medium-scale companies in developing countries;

(f) Assist in the development of information technology and networking systems for exchange of information between developing countries and developed and developing countries;

(g) Support and encourage consultancy organizations to introduce quality systems conforming to ISO-9001 standards;

(h) Discuss some international problems such as non-recognition of academic and professional qualifications of experts from developing countries, and the implementation of various provisions of GATS, particularly relating to movement of personnal to develped countries for rendering services and establishing business centres;

(i) Undertake a survey of consulting engineering services provided by developing countries in various industrial sectors to other developing countries.

VI. CONCLUSIONS AND RECOMMENDATIONS

93. The decade of the 1990s is witnessing a new era for consulting engineering services. Rapid advances in information technology, biotechnology, micro-electronics and the like calls for increased efficiency in production processes, cost-effective approaches and more efficient utilization of resources in developing countries. There is a need for strengthening the capabilities of consulting engineering services of developing countries and to broaden their outlook.

Conclusions

94. The conclusions of this study are as follows:

(a) The increasing role of consulting engineering services in developing countries to fulfil their developmental requirements and use of appropriate technologies to achieve desired results needs to be identified;

(b) It calls for increased cooperation between countries from both developing and developed regions in order to better support industrial development of the developing countries and by helping the least developed countries in their efforts towards building their consulting and physical infrastructures;

(c) UNIDO can play a pivotal role in the collection, compilation and dissemination of information regarding demand and supply of consulting engineering services in different industrial sectors;

(d) UNIDO can assist in providing consultants with all information regarding consultancy requirements in different countries to help them in their process of expansion;

(e) There is good scope for exploration of the potential of consultants from some developing countries such as Argentina, Brazil, Egypt,

India, Republic of Korea, Malaysia, Mexico and South Africa who are making their presence felt in the international market and can be of assistance to other developing countries;

(f) There are industrial sectors in developing countries which have high demand for consulting engineering services because of increased spending on infrastructural development. These include small-scale and light industries, transportation, urban development, water supply and sanitation. Other sectors of increased demand are improved agriculture, water resources development and management, information technology, telecommunications, power, environment and software development;

(g) The need for focal points at national and regional levels is very important in order to collect and collate necessary data base, and for ensuring international quality standards to enable them to brace international competitiveness;

(h) In most developing countries, infrastructure development has been opened for private sector participation; hence, consulting engineering services could play a very important role in their development;

(i) The need to engage local international consultants by donor countries and international funding agencies is emphasized to help develop local consultancy servives;

(j) Growth and expansion of the profession with increased exchanges/cooperation through joint ventures/partnerships should help in promoting industrial cooperation on services for industry;

(k) The role of consulting engineering services is crucial in the process of technology transfer. Therefore, greater interaction between countries shall help in the absorption of relevant and appropriate technologies.

Recommendations

95. Governments are expected to:

(a) Recognize the contribution of consulting engineering services in the continuing process of industrialization;

(b) Be supportive to upgradation of skills through training programmes and capacity augmentation of local consultants;

(c) Encourage joint ventures/strategic alliances with consultants from developed countries ensuring that lead roles to project extension are also given to domestic consultants;

(d) Categorize projects in terms of their complexity, operational skills, investment and technology required as a tool to encourage and facilitate project/product execution, and implementation by local consultants;

(e) Facilitate provision of services and timely information to local consultants through established institutions, embassies and commercial representatives abroad;

(f) Involve national associations, federations and/or other focal points to formulate procedures for providing certification and accreditation to domestic consultants;

(g) Ensure greater transparency in the selection of consultants;

(h) Ensure better market access through objective utilization of available multilateral or bilateral funds.

96. National associations of consultants and focal points are expected to ecourage promotion, development and regulation of consulting engineering services to create an enabling environment for:

(a) Greater interaction between consultants and the government aimed at due representation of consultants in government policies;

(b) Identifying and implementing effective measures for growth of consulting engineering services in the true spirit of GATS;

(c) Setting up joint ventures and other partnerships in areas of agreed interests with improved investment opportunities and transfer of technology in specialized hi-tech areas;

(d) Fostering interactive relationships with similar associations/ agencies in other develping countries;

(e) Increased availability of data base and information systems for dissemination of information to consultants;

(f) Fostering public awareness and organizing training programmes inlcuding study tours, workshops and seminars;

(g) Soliciting support of international organizations for the promotion and enhancement of activities of consultants;

(h) UNIDO is requested to support the development and promotion of consulting engineering services in the developing countries. For this, it is recommended to set up a Panel of Experts with the inclusion of representatives of consulting engineers.

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